

OVERVIEW OF PROPANIL RISK ASSESSMENT

May 20, 2002

Introduction

This document summarizes EPA's human health, environmental fate and transport and ecological risk findings for the anilide pesticide propanil, as presented fully in the documents, "Propanil: HED Revised Human Health Risk Assessment for the Reregistration Eligibility Decision," dated February 28, 2002 and "HED Review of Environmental Fate and Ecological Effects for the Reregistration Eligibility Decision for Propanil," dated October 4, 2001. The purpose of this overview is to help the reader by identifying the key features and findings of the risk assessments. References to relevant sections in the complete documents are provided to allow the reader to find the place in the risk assessments where a more detailed explanation is provided. This overview was developed in response to general comments from the public which indicated that EPA's risk assessments were difficult to understand, that they were too lengthy and that it was not easy to compare the assessments for different chemicals due to the use of different formats.

These propanil risk assessments and additional supporting documents are posted on the Agency's website at <http://www.epa.gov/pesticides/reregistration/status.htm> and are also available in the OPP Pesticide Regulatory Docket for public viewing. Meetings with stakeholders (i.e., growers, extension officials, commodity group representatives and other government officials) will be held to discuss the risk assessments, the identified risks and solicit input on risk mitigation strategies, if needed. This feedback will be used to complete the Reregistration Eligibility Decision (RED) document, which will include the resulting risk management decisions. For propanil, the Agency intends to proceed with completing the tolerance assessment, because dietary risks including drinking water are not of concern and no mitigation is needed at this time. The Agency is still reviewing any possible risk to workers and the environment and, if risk mitigation is required, EPA will provide its risk management decision for workers and the environment by late 2002. The Agency plans to conduct a close-out conference call with interested stakeholders to describe the regulatory decisions presented in the RED.

Risks summarized in this document are those that result only from the use of propanil. The Food Quality Protection Act (FQPA) requires that the Agency consider "available information" concerning the cumulative effects of a particular pesticide's residues and "other substances that have a common mechanism of toxicity." The reason for consideration of other substances is due to the possibility that low-level exposures to multiple chemical substances that cause a common toxic effect by a common mechanism could lead to the same adverse health effect as would a higher level of exposure to any of the other substances individually. The Agency does not have sufficient information at this time to determine whether the anilide pesticides, such as propanil, share a common mechanism of toxicity. Further, the Agency is in the process of developing criteria for characterizing and testing endocrine disrupting chemicals and plans to implement an Endocrine Disruptor Screening Program in the near future. Propanil will be reevaluated at that time and additional testing may be required.

Use Profile

- **Herbicide:** Registered for selective post-emergent control of broadleaf weeds and grass in commercial settings on rice, barley, oats and spring wheat. Registered uses of propanil on barley, oats and spring wheat are geographically limited to the states of Minnesota, Montana, North Dakota and South Dakota whereas uses on rice are limited to California and the mid-southern states (Arkansas, Louisiana, Missouri, Mississippi and Texas). Propanil is also registered (but not currently marketed) for turf use at commercial sod farms. There are no existing or proposed residential uses of propanil products.
- **Formulations:** Available as an emulsifiable concentrate liquid (16.6-58% active ingredient (a.i.)), a water dispersable granule (or dry flowable) (59.6-81% a.i.), a soluble concentrate liquid (41.2-80.2% a.i.) and a flowable concentrate (41.2% a.i.).
- **Methods of Application:** Applied as a broadcast treatment by groundboom sprayers and aerial equipment.
- **Use Rates:** For treating small grains, the maximum application rate is 1.4 lbs. a.i./A. The maximum application rate for rice is 8 lbs. a.i./A and the maximum application rate for turf is 10 lbs. a.i./A. The maximum rate for rice is typically applied in two 4 lbs. a.i./A applications or a single 6 lbs. a.i./A emergency treatment.
- **Annual Poundage:** The estimate for total U.S. domestic use (annual average) is approximately 7 million pounds of active ingredient per year on a total of approximately 2 million acres treated. Use on rice accounts for approximately ninety-nine percent (99%) of the annual average. Fifty to seventy percent (50% to 70%) of the U.S. rice crop is treated with propanil. Small grains comprise the remaining 1% of the annual average.
- **Registrants:** Dow AgroSciences and RiceCo.

Human Health Risk Assessment

Acute Dietary (Food) Risk

(For a complete discussion, see Section 4.2.7 of the Human Health Risk Assessment)

EPA has not assessed acute dietary risk for propanil because no appropriate endpoint attributable to a single exposure (dose) could be identified. An acute dietary reference dose (RfD) was not established.

Chronic Dietary (Food) Risk

(For a complete discussion, see Section 4.2.7 of the Human Health Risk Assessment)

Chronic dietary risk is calculated by using the average consumption value for food and average residue values on those foods. A risk estimate that is less than 100% of the chronic RfD (cRfD), the

dose at which an individual could be exposed over the course of a lifetime and no adverse health effects would be expected, does not exceed the Agency's level of concern. The chronic population adjusted dose (cPAD) is the cRfD adjusted for the FQPA Safety Factor.

- Chronic risk estimates from exposures to propanil in food do not exceed the Agency's level of concern (i.e., they are less than 100% of the cPAD). The chronic dietary (food only) risk estimate is 13% of the cPAD, for the most highly exposed population subgroup, all infants (<1 year).
- To calculate chronic dietary risk from food, EPA used the Dietary Exposure Evaluation Model (DEEM™), along with average residue estimated from field trial data, and assumed 70% of the rice crop was treated with propanil. Field data are generally considered to be an upper-bound estimate of actual residues, and 70% is also a high end estimate of the percent of the present rice crop treated. Thus, actual dietary risk is likely to be less than indicated by EPA's assessment.
- The toxicity endpoint for the chronic dietary assessment is decreased hemoglobin, red blood cell count and/or packed cell volumes and is calculated using the LOAEL (9 mg/kg/day) from the chronic/carcinogenicity study in the rat (no NOAEL was identified).
- The FQPA Safety Factor is 10x. EPA retained this factor for chronic exposures based on the following evidence: (1) increased susceptibility following pre- and post-natal exposure to propanil in the 2-generation reproduction study in rats; (2) a developmental neurotoxicity study with propanil is triggered due to suggestive evidence of neurotoxicity in the data base including sciatic nerve degeneration in a rat chronic/carcinogenicity study; and (3) there is also evidence consistent with neuroendocrine disruption in the 2-generation reproduction study in rats and in the rat chronic/carcinogenicity study.
- The total Uncertainty Factor (UF) used in the RfD derivation is 300x. The UF is 100x (10x for inter-species extrapolation and 10x for intra-species variability). An additional UF of 3x is applied for the use of a LOAEL instead of a NOAEL for an overall UF of 3,000x.
- Thus, the cRfD = 0.03 mg/kg/day and the cPAD = 0.003 mg/kg/day.

Cancer Dietary (Food) Risk

(For a complete discussion, see section 3.4 of the Human Health Risk Assessment)

The Agency has classified propanil into the category "*Suggestive evidence of carcinogenic potential by all routes of exposure, but not sufficient to assess human carcinogenic potential.*" A quantified carcinogenic dose-response assessment (Q_1^* approach) is not indicated for propanil.

Drinking Water Dietary (Food) Risk

(For a complete discussion, see section 4.3 of the Human Health Risk Assessment)

Drinking water exposure to pesticides can occur through ground and surface water contamination. EPA considers both acute (one day) and chronic (lifetime) drinking water risks and uses either modeling or actual monitoring data, if available, to estimate those risks. To determine the maximum allowable contribution of water allowed in the diet, EPA first looks at how much of the

overall allowable risk is contributed by food, then calculates a “drinking water level of comparison” (DWLOC) to determine whether modeled or monitoring estimates exceed this level. In the case of propanil, no acute drinking water assessment has been conducted, because no acute endpoint was identified.

The environmental fate database is complete for propanil. Available data indicate that propanil will not persist in the environment and is in the medium mobility class for sand, sandy loam and clay loam soils, based on available mobility studies. Due to its mobility, propanil could possibly reach ground water but due to its rapid metabolism in a water/soil matrix, it is unlikely to persist for a sufficient amount of time to leach in significant quantities. [The possible exception are sites of extreme vulnerability and low metabolic capacity which would most likely occur only for terrestrial uses. However, if propanil does reach ground water in these vulnerable areas, it is expected to be stable]. Propanil and its principle metabolic degradate, 3,4-DCA, and residues convertible to 3,4-DCA are the residues of concern for the drinking water risk assessment.

Monitoring data for propanil residues in ground and surface water are available but not adequate to develop EECs for the aggregate dietary (food and water) risk assessment. Although not targeted to specific propanil use areas, USGS monitoring data do provide some information on the magnitude and frequency of propanil and 3,4-DCA detections. Propanil was found in about 3% of the 1,560 surface water samples analyzed with a maximum concentration of 2 ppb. 3,4-DCA was found in about 50% of the 68 samples with a maximum concentration of 8.9 ppb. Models have been used to estimate ground and surface water concentrations expected from normal agricultural use.

Surface water estimated environmental concentrations (EECs), a range of 6-72 ppb, are below the DWLOC for all population subgroups except for children at the upper-bound EEC of 72 ppb. This subpopulation of children could be an area of concern because exposure estimates for this group exceed the DWLOC; however, the Agency believes that the concerns have been addressed by the conservative assumption (field trial residue levels) used in the chronic dietary calculation. In this case, the Agency concludes that residues of propanil *per se* and 3,4-dichloroaniline (3,4-DCA) (combined) are less than the estimated DWLOC; and a conclusion can be drawn that no adverse toxicological effect will occur due to aggregate chronic exposure. Estimated drinking water concentrations are based on a PRZM-EXAMS screening model, which is a Tier II assessment that provides more refined, less upper-bound assumptions. The range of EECs represents different rice growing areas and normal vs. overflow release. The following table (Table 1) lists the chronic DWLOCs for propanil.

Table 1. Chronic Drinking Water Levels of Comparison.

Population Subgroup	cPAD (mg/kg/day)	Chronic Food Exposure (mg/kg/day)	Maximum Chronic Water Exposure (mg/kg/day)	Groundwater EEC (Rice) (ppb)	Surface Water EEC (Rice) (ppb) based on Propanil and 3,4-DCA	DWLOC chronic (ppb)
Children	0.003	0.000351	0.002649	0.4	Range of: 6 - 72	26
Females	0.003	0.000129	0.002871	0.4	6 - 72	86
Males	0.003	0.000144	0.002856	0.4	6 - 72	100

Estimated ground water concentrations are based on the SCI-GROW screening model, which is a Tier I assessment that provides a high-end estimate. The drinking water EEC for ground water (0.35 ppb) is below the DWLOC for all population subgroups.

Residential Risk

(For a complete discussion, see Section 4.4 of the Human Health Risk Assessment)

Propanil is not registered for residential (home) use, nor is it used in or around public buildings, schools or recreational areas where children might be exposed. Thus, there is no residential exposure to aggregate with the dietary exposure.

The turf use is restricted to commercial sod farms only. Although propanil-treated sod may eventually be used in residential settings (i.e., residential lawns), propanil residues are not expected to exceed levels of concern for residential post-application risk. Since the proposed use of propanil on turf is post-emergent, applied at sod farms early in the turf growing season (well before harvest), the Agency concludes that the amount of time is adequate to allow residue dissipation to a level that would not cause any significant exposure to residents.

Aggregate Risk

(For a complete discussion, see section 5.0 of the Human Health Risk Assessment)

The aggregate risk assessment for propanil examines the combined risk from exposure through food and drinking water *only*. Chronic residential exposures are not expected because there are no residential uses for propanil and, thus, are not included in the aggregate risk assessment. For propanil, the only interval of exposure to be assessed is chronic (one year or more) and the only route of exposure to be assessed is oral (food and water). Generally, combined risks from these exposures that are less than 100% of the cPAD is not considered to be a risk concern.

Available data indicates that 3,4-DCA is a major metabolic degradate of propanil. 3,4-DCA is also a metabolite of linuron and diuron, but to a lesser extent. EPA's Metabolism Assessment Review Committee does not recommend aggregating residues of 3,4-DCA for the propanil and linuron risk assessments. 3,4-DCA is a significant residue of concern for propanil, but is not a residue of concern *per se* for linuron or diuron. Submitted data indicates that the maximum amount of 3,4-DCA formed

from propanil is approximately 50% of propanil initially applied, based on results from the aerobic soil metabolism study (MRID 41538701). Neither linuron nor diuron metabolize to 3,4-DCA in appreciable amounts (less than 1% detection rate) of the parent compound in animal, plant and water metabolism studies.

The registered uses for propanil, linuron and diuron result in minimal co-occurrence of use. That is, there is very little overlap of use patterns and the use patterns are geographically limited for each active chemical. Therefore, the risk assessments for each individual chemical fully assess the risks posed by the parent compound and the metabolite, 3,4-DCA, individually.

FDA monitoring data were available, but not sufficient, due to lack of analysis for 3,4-DCA. Therefore, the chronic dietary risks were estimated using average residue values derived from field trial data and the estimate that 70% of the rice crop was treated. These assumptions lead to a high end estimate of dietary risks; however, the Agency believes that risk concerns have been addressed by the conservative assumption (field trial residue levels) used in the chronic dietary calculation. In general, the EEC estimates for propanil and 3,4-DCA are less than the estimated DWLOC; and EPA concludes that there are no risks of concern.

Occupational Risk

(For a complete discussion, see section 7.0 of the Human Health Risk Assessment)

People can be exposed to a pesticide while working through mixing, loading, application activities or when guiding aerial applications (flaggers) and reentering a treated site. Handler and worker risks are measured by an MOE which determine how close the occupational exposure comes to a NOAEL or LOAEL. Generally, MOEs greater than 100 do not exceed the Agency's level of concern. The target MOE value for propanil is 300 due to the use of a LOAEL instead of a NOAEL, therefore any MOE less than 300 is considered a risk concern. For workers entering a treated site, Restricted Entry Intervals (REIs) are calculated to determine the minimum length of time required before workers or others are allowed to reenter.

Occupational risk is assessed for exposure at the time of application (termed "handler" exposure) and for exposure following application (termed "post-application" exposure). Handler risk is assessed for mixer/loader, applicators (drivers, pilots, etc.) and flaggers, and is based on combining both dermal and inhalation exposures. Post-application risk is assessed for activities such as scouting, irrigating, pruning and harvesting and is based primarily on dermal exposure. Long-term worker exposure is not expected for propanil. The following is a summary of occupational risk:

- The risk to mixers, loaders and applicators handling and applying propanil using aerial and groundboom equipment is of concern for many occupational exposure scenarios, even with maximum personal protective equipment and risk reduction measures.
- A REI of 24 hours for rice and 18 days for turf are necessary to adequately address post-application reentry risks. Current propanil labels have a 24 hour REI.
- For both short and intermediate dermal and inhalation exposures, propanil MOEs are determined by a comparison of specific exposure scenario estimates to the LOAEL of 9.0 mg/kg/day observed in the rat chronic feeding/carcinogenicity study. EPA chose an endpoint from the

chronic study because the principal toxicological effect, methemoglobinemia, was not measured in the 21-day dermal toxicity study more typically used to assess worker risk. In the absence of inhalation data, inhalation exposure was assumed to be equivalent to oral exposure.

- A dermal absorption factor of 20% was calculated by comparing the LOAEL of oral and dermal rabbit studies. An inhalation absorption factor of 100% was assumed in the absence of data.
- The Agency has established a “target” MOE of 300 for propanil users based on the standard uncertainty factors of 10x (inter-species extrapolation); 10x (intra-species variability) and an additional 3x for the lack of a NOAEL in the rat chronic toxicity/carcinogenicity study.

Occupational Handler Summary

(For a complete discussion, see Section 7.2 of the Human Health Risk Assessment)

The Agency has identified five major occupational exposure scenarios based on the types of equipment and techniques that potentially can be used for propanil applications. Based on the general use pattern for propanil, the following occupational exposure scenarios were identified for the *handler* risk assessment:

- (1a) Mixing/loading liquids for aerial application;
- (1b) Mixing/loading liquids for ground application;
- (2a) Mixing/loading dry flowable for aerial application;
- (2b) Mixing/loading dry flowable for ground application;
- (3) Applying sprays with aerial equipment;
- (4) Applying liquids with groundboom sprayer; and
- (5) Flagging sprays for aerial application.

Propanil labels prohibit application by chemigation. Chemical-specific data to assess the above exposure scenarios were not submitted to the Agency in support of the reregistration of propanil. Instead, exposure estimates for these scenarios are taken from the Pesticide Handlers Exposure Database (PHED) which is used to assess handler exposures for regulatory actions when chemical-specific monitoring data are not available.

Handler Risk Scenarios

(For a complete discussion, see Section 7.2.5 of the Human Health Risk Assessment)

No acceptable chemical-specific exposure data were available to assess the above occupational exposure scenarios in support of the reregistration of propanil. Instead, surrogate-based exposure assessments for each scenario were developed, where appropriate, using the PHED. Most current propanil labels have the following PPE requirements for handlers: long sleeve shirt, long pants, waterproof gloves, shoes, socks and protective eye wear. Some labels have additional PPE requirements of chemical-resistant headgear for overhead exposure. Other labels state only that eye and skin protection should be worn when handling and entering treated areas before they have dried.

Handler exposure assessments were completed using a baseline exposure scenario and, as necessary, taking into account increasing levels of risk mitigation (PPE and engineering controls) in an attempt to achieve an adequate MOE.

- The baseline scenario generally represents a handler wearing long pants, a long-sleeved shirt, no respirator and no chemical-resistant gloves.
- The additional PPE scenario generally represents a handler wearing long pants, long-sleeved shirt, socks, shoes, coveralls, chemical-resistant gloves and a NIOSH-approved respirator with an organic vapor removing cartridge.
- The engineering controls scenario represents a handler wearing long pants, long sleeved shirt, socks, shoes, chemical-resistant gloves (airblast only) and using closed mixing/loading systems and enclosed cab, truck or cockpit.

The short- and intermediate-term dermal and inhalation MOE estimates for propanil were combined based on their having the same endpoint. MOE estimates were calculated for all scenarios at baseline, minimum PPE, maximum PPE and engineering control level exposures, ranging from 0.06 (Baseline PPE) to 12,000 (Engineering Controls). A 98% protection factor was applied to the baseline unit exposure values to determine the unit exposure for the engineering control level of protection for the dry flowable scenarios.

The target MOE of 300 was met or exceeded at either the *baseline, minimum PPE, maximum PPE* or *engineering control* levels for many of the short- and intermediate-term occupational exposure scenarios for mixing, loading, applying and flagging during application of propanil to rice, small grains and turf. This information is presented fully in Table 4 of the document, “Occupational and Residential Exposure Assessment and Recommendations for the Reregistration Eligibility Decision Document for Propanil (1st Revision),” dated February 28, 2002.

The combined dermal and inhalation MOEs were **less than** the target MOE of 300 with *maximum risk reduction measures* for the following occupational exposure scenarios:

- Scenario (1a) mixing/loading liquids for aerial application to rice at 350, 1,200 and 3,200 acres at 6 lbs a.i./acre; mixing/loading liquids for aerial application to rice at 1,200 and 3,200 acres at 3 lbs. a.i./acre; and mixing/loading liquids for aerial application to small grains at 1,200 acres at 1.14 lbs. a.i./acre and mixing/loading liquids for aerial application to turf at 350 acres at 10 lbs. a.i./acre;
- Scenario (1b) mixing/loading liquids for groundboom application to rice at 200 acres at 6 lbs. a.i./acre;
- Scenario (2a) mixing/loading dry flowable for aerial application to rice at 3,200 acres at 6 lbs. a.i./acre and mixing/loading dry flowable for aerial application to rice at 3,200 acres at 3 lbs. ai/acre; and
- Scenario (3) applying sprays, using aerial application to rice at 350, 1,200, and 3,200 acres at 6 lbs. a.i./acre and applying sprays, using aerial application to turf at 350 acres at 10 lbs. a.i./acre.

Post-Application Occupational Risk

(For a complete discussion, see Section 7.3 of the Human Health Risk Assessment)

Workers can be exposed to propanil residues, at varying levels, by entering previously treated areas to perform certain agricultural activities. Exposure also varies with the level of propanil residue in

the environment and the duration of the activity. The Agency is concerned about post-application exposure to crop advisors (scouts) and all other field workers (hoers, irrigators, etc.). Most of the current propanil labels show an REI requirement of 24 hours and specify the following early entry PPE: long sleeve shirts, long pants, waterproof gloves, shoes, socks and protective eye wear. A few labels also specify chemical-resistant footwear and chemical-resistant headgear for overhead exposure.

Although the Worker Protection Standard (WPS) provides a basic level of protection for pesticide workers, the reregistration process reexamines, by the MOE approach, the REIs and entry restrictions necessary to protect reentry workers. Lacking propanil-specific data relating to post-application exposure, a surrogate-type of reentry exposure assessment has been made which is quantified by estimating the amount of residue available (dislodgeable foliar residue (DFR) and/or turf transferrable residue (TTR)) for uptake and by estimating the rate of uptake for specific activities by using “transfer coefficients.”

No propanil-specific DFR or TTR data exist. Instead, the DFR estimate is based on an estimate of 20% of the rate applied as initial DFR for rice and small grains and 5% of the rate applied as initial TTR for turf. A dissipation rate of 10% per day is estimated for rice, small grains and turf. Transfer coefficients used in the risk assessment for rice and small grains (barley and spring wheat) are from the Agricultural Reentry Task Force (ARTF) database. An interim transfer coefficient policy was developed by the Agency’s Science Advisory Council for Exposure using the ARTF database. It is the Agency’s intention that this policy will be periodically updated to incorporate additional information about agricultural practices in crops and new data on transfer coefficients. Much of this information will originate from exposure studies currently being conducted by the ARTF, from the further analysis of studies already submitted to the Agency and from the studies in the published scientific literature. In summary regarding the post-application occupational risk assessment:

- The rice and small grain surrogate assessments use the lower transfer coefficient of 100 cm²/hr associated with minimal foliage development based on propanil’s early season use (application to rice approximately 14 and 35-40 days after planting with harvest at 120-140 days and in small grains before the five-leaf stage).
- The sod/turf farm surrogate assessment used a low transfer coefficient of 500 cm²/hr for the activities of aerating, fertilizing, mowing and scouting and a high transfer coefficient of 16,500 cm²/hr for the activities of transplanting and weeding.

The following post-application exposure scenarios **meet or exceed** the target MOE of 300:

- The estimated MOE for rice (325) at the maximum application rate (6 lbs. a.i./acre) exceeds the target MOE one day after application (> 24 hours) for scouting in (minimal foliage development based on early season use). In addition, the estimated MOE for rice (585) at a typical application rate (3 lbs. a.i./acre) is greater than the target MOE on the day of application (12 hours after application) for scouting (minimal foliage development).
- The estimated MOE for small grains (1,541) at a typical application rate (1.14 lbs. a.i./acre) exceeds the target MOE on the day of application for scouting (minimal foliage development).
- The calculated MOE for sod farms (703) at a typical application rate (10 lbs. a.i./acre) is greater

than the target MOE on the day of application for activities such as aerating, fertilizing, hand pruning, irrigating, scouting and mechanical harvesting and weeding.

The following post-application exposure scenario does not **meet or exceed** the target MOE of 300:

- In addition, the estimated MOE for sod farms (12) at a typical application rate (10 lbs. a.i./acre) falls short of the target MOE on the day of application for activities such as transplanting and hand weeding. A REI of 18 days would result in an MOE of >300.

Ecological Risk

To estimate potential ecological risk, EPA integrates the results of exposure and ecotoxicity studies using the quotient method. Risk quotients (RQs) are calculated by dividing exposure estimates by ecotoxicity values, both acute and chronic, for various wildlife species. RQs are then compared to levels of concern (LOCs). Generally, the higher the RQ, the greater the potential risk. Risk characterization provides further information on the likelihood of adverse effects occurring by considering the fate of the chemical in the environment, communities and species potentially at risk, their spatial and temporal distributions and the nature of the effects observed in studies. LOCs range from 0.05 to 1 depending on species and duration of exposure.

Environmental Fate and Transport

(For a complete discussion, see Section III of the Environmental Fate & Ecological Effects Risk Assessment)

Based on its environmental fate properties, propanil is rapidly metabolized under aerobic or anaerobic conditions in a water/soil matrix. Propanil has medium mobility in sand, sandy loam and clay loam soils, and has low mobility in silty clay loam and silt loam soils. Propanil has the potential to reach ground water because of its rapid metabolism in a water/soil matrix but it is not likely to persist for a significant amount of time to leach in measurable quantities.

Due to limited environmental fate data on 3,4-DCA, the Agency is unable to sufficiently assess its environmental fate and transport. However, the Agency has received surface water monitoring data that demonstrate the tendency for 3,4-DCA to leave fields treated with propanil. Overall concentrations ranged from below the detection limit of 0.05 ppb to 26 ppb, with the majority of the sample detections being <1 ppb. The Agency suspects that the primary source of the 3,4 DCA detections was from propanil use because 3,4-DCA is the primary degradation product of propanil. Although the monitoring data indicates 3,4-DCA concentrations in surface water may occur from propanil use, EPA needs guideline environmental fate and transport data in order to assess the potential risk of 3,4 DCA to nontarget organisms.

- Propanil metabolized rapidly in aerobic soil with a half-life of 0.5 days. However, propanil is stable to hydrolysis at pHs 5, 7 and 9 in the laboratory and is stable to unsensitized aqueous photolysis.
- Propanil is stable to photodegradation. Propanil is susceptible to biodegradation, yet stable to chemical degradative processes.

- Aquatic field dissipation studies observed in rice paddies indicate short half-lives for propanil in the water (undetectable after no more than one day) and in the soil (sediment detections were near the quantitation limit (0.01 ppm) in 2-7 days). Detectable residues are confined largely to the top 2 inches of the sediment.
- The propanil degradate, 3,4-DCA, reached a peak value (2.7 ppm) in soil (sediment) at 1-5 days after the second of two applications, remained high for 1-2 weeks and was near detection limits (0.01 ppm) for 4 to 6 months.

Nontarget Terrestrial Organism Risk

(For a complete discussion, see Section V of the Environmental Fate & Ecological Effects Risk Assessment)

- Propanil is classified as moderately toxic to avian species on an acute oral basis. Propanil is classified as very slightly toxic to avian species on a subacute dietary basis.
- The labeled use of propanil on rice is expected to slightly exceed the LOC for acute and chronic risks to birds (including endangered species). Avian Acute RQs range from 0.32 to 0.69.
- The labeled use of propanil on turf is expected to slightly exceed the LOC for acute and chronic risks to mammals (including endangered species). Mammalian Acute RQs range from 0.10 to 1.40.

Nontarget Aquatic Organism Risk

(For a complete discussion, see Section IX of the Environmental Fate & Ecological Effects Risk Assessment)

- Propanil is categorized as slightly to moderately toxic to freshwater fish and moderately toxic to freshwater invertebrates, estuarine/marine fish and estuarine/marine invertebrates.
- The LOC for the small grain use is slightly exceeded on a chronic basis (RQs ranging from <1 to 1.4) for freshwater fish and invertebrates (including endangered species). There are no acute risk concerns for freshwater fish and invertebrates (including endangered species).
- The LOC for the turf use is slightly exceeded on a chronic basis (RQs ranging from 1.4 to 6.3) and on an acute basis (RQs ranging from 0.09 to 0.2) for freshwater fish and invertebrates (including endangered species).
- The LOC for the small grain use is slightly exceeded on an acute basis (the RQ is 0.12) only for estuarine/marine invertebrates (including endangered species).
- The LOC for the turf use is exceeded on an acute basis (RQs ranging from 0.05 to 0.54) for estuarine/marine fish and invertebrates (including endangered species). There are no data to assess chronic risk to estuarine/marine fish and invertebrates (including endangered species).

Nontarget Insect Risk

(For a complete discussion, see Sections VI & XI of the Environmental Fate & Ecological Effects Risk Assessment)

Propanil is practically nontoxic to the honeybee and its use on rice is predicted to not exceed any LOC to nontarget insects. Since propanil is practically nontoxic to the honeybee, the propanil turf use is predicted to pose minimal risk to nontarget insects. The Agency suspects that the major degradate of propanil, 3,4-DCA, may cause adverse effects on nontarget insects. However, EPA's concerns about 3,4 DCA are based upon limited data. In order to adequately assess the risks of 3,4 DCA, more environmental fate and ecological toxicity data are needed.

Nontarget Terrestrial Plant Risk

(For a complete discussion, see Sections VII & XII of the Environmental Fate & Ecological Effects Risk Assessment)

Since the submission of chemical-specific data to assess the vegetative vigor RQ for propanil has not yet been fulfilled, the Agency must assume risk to nontarget plants from propanil use on rice due to its herbicidal mode of action, the amount of spray drift that occurs from application and one reported incident of plant damage following aerial application of propanil as described in the following section.

Incident Data

(For a complete discussion, see Section II of the Environmental Fate & Ecological Effects Risk Assessment)

There are no reported incidents on birds or fish. There is one incident report associated with adverse effects (damage) to nontarget terrestrial plants as a result of spray drift of propanil applied to rice. An analysis was not conducted, but due to the proximity of the aerial application to the trees, the official report concluded that the aerial application of propanil to rice fields in Craighead, AR was likely the cause of damage (moderate-to-severe leaf injury) to trees located adjacent to the treated field.

Summary of Pending Data

No previously called-in data are pending at this time; however, the following confirmatory data requirements have been initially identified by the Agency to further characterize the toxicity of propanil following short- or intermediate-term exposures:

Ecological Effects Data for OPPTS Guidelines:

- 850.1010 Freshwater and Estuarine/Marine Invertebrate Acute Toxicity on 3,4-DCA
- 850.1075 Freshwater and Estuarine/Marine Fish Acute Toxicity on 3,4-DCA
- 850.1300 Early-Life Stage in Freshwater and Estuarine/Marine Fish on 3,4-DCA
- 850.1350 Life Cycle in Freshwater and Estuarine/Marine Invertebrates on 3,4-DCA
- 850.2200 Avian Subacute Dietary Toxicity - Bobwhite Quail on 3,4-DCA
- 850.2300 Avian Reproduction - Bobwhite Quail/Mallard Duck on 3,4-DCA
- 850.4100 Seedling Emergence and Vegetative Vigor (Tier 1) on 3,4-DCA
- 850.4250 Vegetative Vigor (Tier 2) on Propanil - TEP

Toxicology Data for OPPTS Guidelines:

- 870.3465 90-Day Inhalation - Rat

- 870.6200 Acute Neurotoxicity Screening Battery - Rat
- 870.6300 Developmental Neurotoxicity Study - Rat
- 870.7800 Immunotoxicity Study - Rat

Environmental Fate Data for OPPTS Guidelines:

- 835.1230 Sediment and Soil Adsorption/Desorption on 3,4-DCA
- 835.2120 Hydrolysis on 3,4-DCA
- 835.2240 Photodegradation (Water) on 3,4-DCA

Nonguideline study:

- 30-Day Oral Toxicity - Rat